

Certificate in High Voltage Electrical Systems

Course overview

The objective of this programme is to upskill electricians and electrical engineers in the niche and highly specialised area of High Voltage Electrical Systems. It will develop the competence of its graduates in areas such as High Voltage electrical installations, grid connections, substation maintenance and switching facilities.

This fully accredited programme will provide companies working in these areas with a new benchmark in terms of upskilling and certifying staff working in these environments.

30 Credits
Technical

+

10 Credits
HV Health
& Safety

+

20 Credits
Work Based

=

60 Credits

- This programme will provide learners with core competencies required to advance their career within the High Voltage Systems sector
- It will expose learners to a blend of theoretical and practical learning content
- It will provide an opportunity for peer learning exposure (Eg. field trips, practical engagement with other students)
- Content will be delivered across two modern learning campuses (SETU Waterford and TUS Limerick).



Employer obligations

- ensure participants line manager supports the learner for duration of programme
- allocate suitable time for them to attend classes and complete coursework
- provide a suitably qualified industry mentor to assist with the work-based learning aspects of the programme.

Programme modules

Semester 1 – Waterford

AC Electrical Theory	5 Credits
Review of Resistance / Reactance / Impedance, Single phase Series / Parallel. AC Power – power factor correction, three phase Star Delta, Three phase balanced / unbalanced loads. Fault conditions – calculation of fault currents, short circuit, symmetrical / non symmetrical	
Substation Design and Layout	5 Credits
Earthing systems in substations, Earthing practice – potential rise, step and touch voltages, Soil Resistivity, Fault Calculations, Equipment Rating. DC systems in substations. ARC Suppression, Special Protection Systems	
High Voltage Power Grid & Infrastructure	5 Credits
Transmission/Distribution HV /MV/LV systems SLD, Cable/Conductor – selection, testing. HV/MV/LV Infrastructure. DSO/TSO Single market, metering, tariffs. Installations and Connection of Distributed Generators and storage (Wind, PV, Storage)	
High Voltage Safety Compliance	5 Credits
Review of Relevant Standards, Directives, Practices and Statutory Bodies. Role of Authorised and senior authorised person. Role of PSDP and PSCS Development of RAMS and safe system of work plans. Safety Clearances Hazard Zones / Exclusion Zone / Heights. Learners to develop risk assessments, method statements for typical work based tasks, Learners to review employer safety statements and procedures.	
Industrial Portfolio (1)	10 Credits
Work Based Learning (supervised by Industry Mentor)	

Career Opportunities

There is an international shortage of High Voltage skills and hence completion of this programme will create a range of career opportunities across a wide variety of industries. In addition many Irish companies need to promote from within into supervisory or managerial positions such as Authorised Person, Installation manager, Workplace co-ordinator etc. This programme is designed exactly for that reason and is a perfect starting point to help pivot into those roles.

Semester 2 – Limerick

High Voltage Protection Systems	5 Credits
Basic Relays – operation and design, timing, specification. Over Current Relays, Intro to Distance / Impedance Relays. Differential Relays. Protection of Transformers. Protection of Bus-bars pilot wire protection.	
Transformer Theory and Practice	5 Credits
Review of Transformer Construction, Three phase Transformers, Calculations - Ideal / Non Ideal. Rating – efficiency, regulation, testing. Vector Group Windings. Instrument Transformers – Voltage and Current Transformers. Oil testing.	
High Voltage Switchgear	5 Credits
Switchgear classification, Bus bars / Feeders, Disconnectors. Reactors / Surge Arrestors, Fuses current limiting / Expulsion, Circuit Breakers, Capacitors / Capacitor banks, Insulators	
High Voltage Safe Working Systems	5 Credits
General and Specialist PPE requirement, HV Earthing requirements, Arcing awareness and precautions and protection. Switching Plans, Lock Out / Tag Out, Interlocks. HV Electrical Switching and Safety procedures – Telemess/JSSP, Relevant code of practice. Batteries and Hazardous Environments	
Industrial Portfolio (2)	10 Credits
Work Based Learning (supervised by Industry Mentor)	

Testimonials

Company A

"I found that the course was very beneficial to me in my everyday work onsite. While it is challenging, I believe it has enhanced my HV knowledge and has only increased my interest in HV Engineering."

Company B

"...the lecturers were experts in their fields and had a great ability to break down the complexity of the subject to an enjoyable learning process. One of the most valuable aspects of the course was the site visits, where we could experience High voltage Infrastructure and switchgear in a controlled environment to further our understanding of what was learned in class. I wanted to broaden my knowledge in the High Voltage sector and this course exceeded my expectations across all modules."

Delivery model

This is a part-time blended learning programme run over one year that utilises a hybrid model of on campus and work-based learning.

In total, this programme will require the student to be released for 24 x Fridays during the academic year (12 days in Semester 1, 12 days in Semester 2).

There is an Industrial Portfolio (work based learning) element to each semester that is completed during the summer 2025 period.

*** Candidates must be able to complete their work-based learning in a mentored High Voltage environment.**

SEMESTER 1	SEMESTER 2	SUMMER 2025
Sept - Dec 2024 12 x Fridays	Jan - May 2025 12 x Fridays	
Waterford (SETU)	Limerick (TUS)	Workplace (Industry Portfolio completion)

In addition to the weekly lectures candidates will need to spend at least an equivalent amount of time on self-directed learning in order to fully understand concepts and complete assignments etc.

Academic support

Students will have full access to a range of supports available online and through Blackboard, our virtual learning environment. These include our new online programme, PACE, which is designed to support students to access and effectively use library resources in order to complete assignments. Additional supports include an Academic Writing Centre and Maths Support Centre, freely available to all students.

Fees and funding

€6,000 Course fee

Cobotics Skillnet (www.coboticsskillnet.ie) is offering 50% funding (€3,000) to eligible companies).

How to apply

www.setu.ie/highvoltage

or

www.tus.ie/courses

Entry requirements

Candidates for this programme must be:

- An electrical employee of a company in the High Voltage sector who will be assigned to projects in the HV sector to enable the student to fulfil the Industry Portfolio modules
- and
- At a minimum, a holder of the following academic and professional qualifications/experience:
 - Advanced Craft Certificate in Electrical (or equivalent) and a minimum of 1 year verified relevant experience in an Industrial Electrical Environment;
 - or
 - Level 7 Ordinary Degree in Engineering in Electrical Engineering (or equivalent) and a minimum of 1 year verified relevant experience in an Industrial Electrical Environment.

Commencement date
September 2024

To apply, contact:
Siobhan Wall
siobhan.wall@setu.ie
Tony Mahon
tony.mahon@tus.ie

